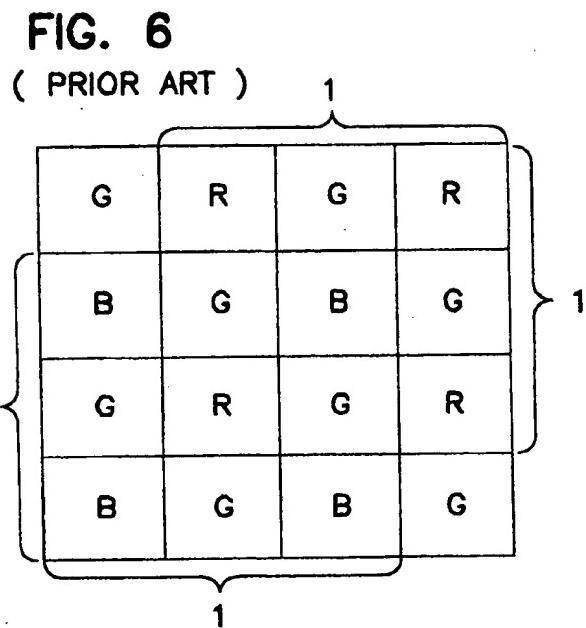
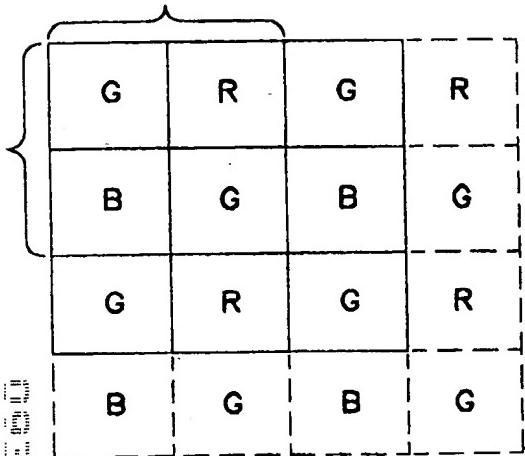
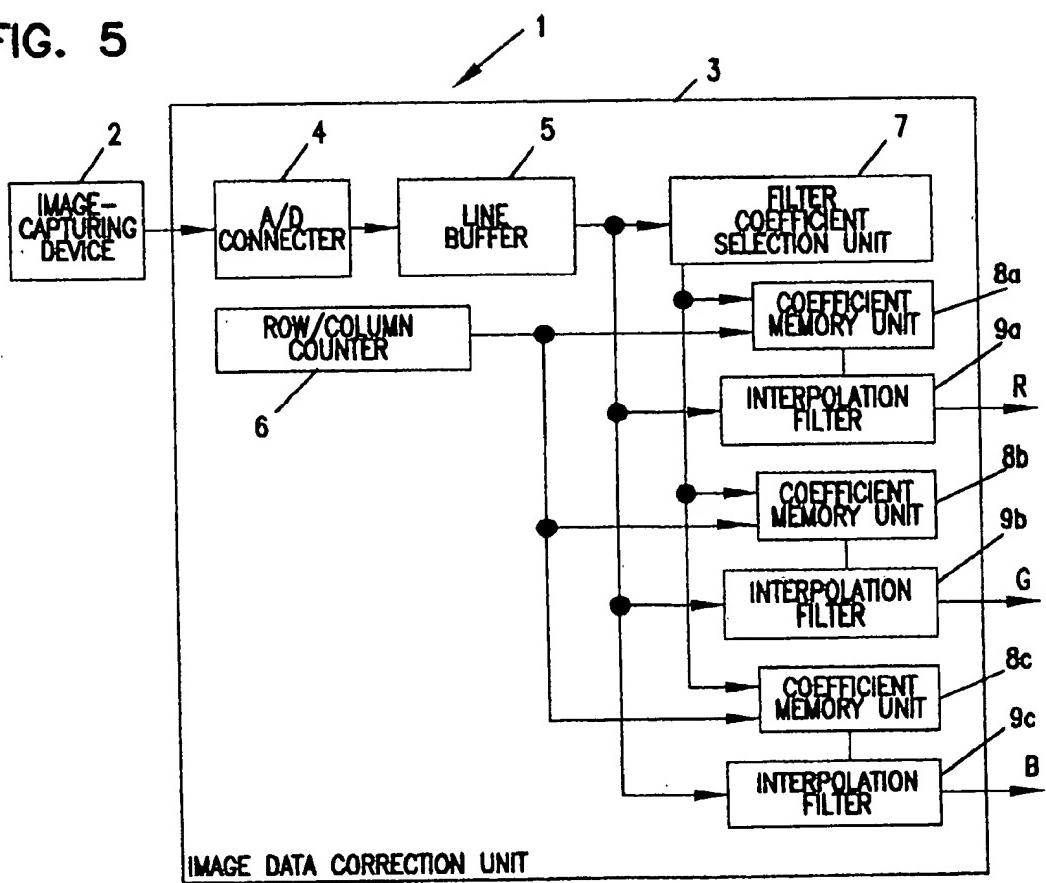


**FIG. 1**  
( P R I O R A R T )



**FIG. 5**



**FIG. 3A**  
( PRIOR ART )

255	255	255
0	0	0
255	255	255

**FIG. 3B**  
( PRIOR ART )

0	0	0
255	255	255
0	0	0

**FIG. 9**

$-1/8$	$1/2$	$-1/8$	$\rightarrow 1/4$	$1/8$	$0$	$1/8$	$\rightarrow 1/4$	$1/8$	$0$	$1/8$	$\rightarrow 1/4$
0	$1/2$	0	$\rightarrow 1/2$	0	$1/2$	0	$\rightarrow 1/2$	$1/2$	$-1/2$	$1/2$	$\rightarrow 1/2$
$-1/8$	$1/2$	$-1/8$	$\rightarrow 1/4$	$1/8$	0	$1/8$	$\rightarrow 1/4$	$1/8$	0	$1/8$	$\rightarrow 1/4$

**(R)**                    **(G)**                    **(B)**

**FIG. 10**

$1/8$	$1/2$	$1/8$	$1/8$	$0$	$1/8$	$-1/8$	$0$	$-1/8$
0	$-1/2$	0	0	$1/2$	0	$1/2$	$1/2$	$1/2$
$1/8$	$1/2$	$1/8$	$1/8$	0	$1/8$	$-1/8$	0	$-1/8$

$\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$        $\downarrow$   
 $1/4$        $1/2$        $1/4$        $1/4$        $1/2$        $1/4$        $1/4$        $1/2$        $1/4$   
**(R)**      **(G)**      **(B)**

FIG. 4A

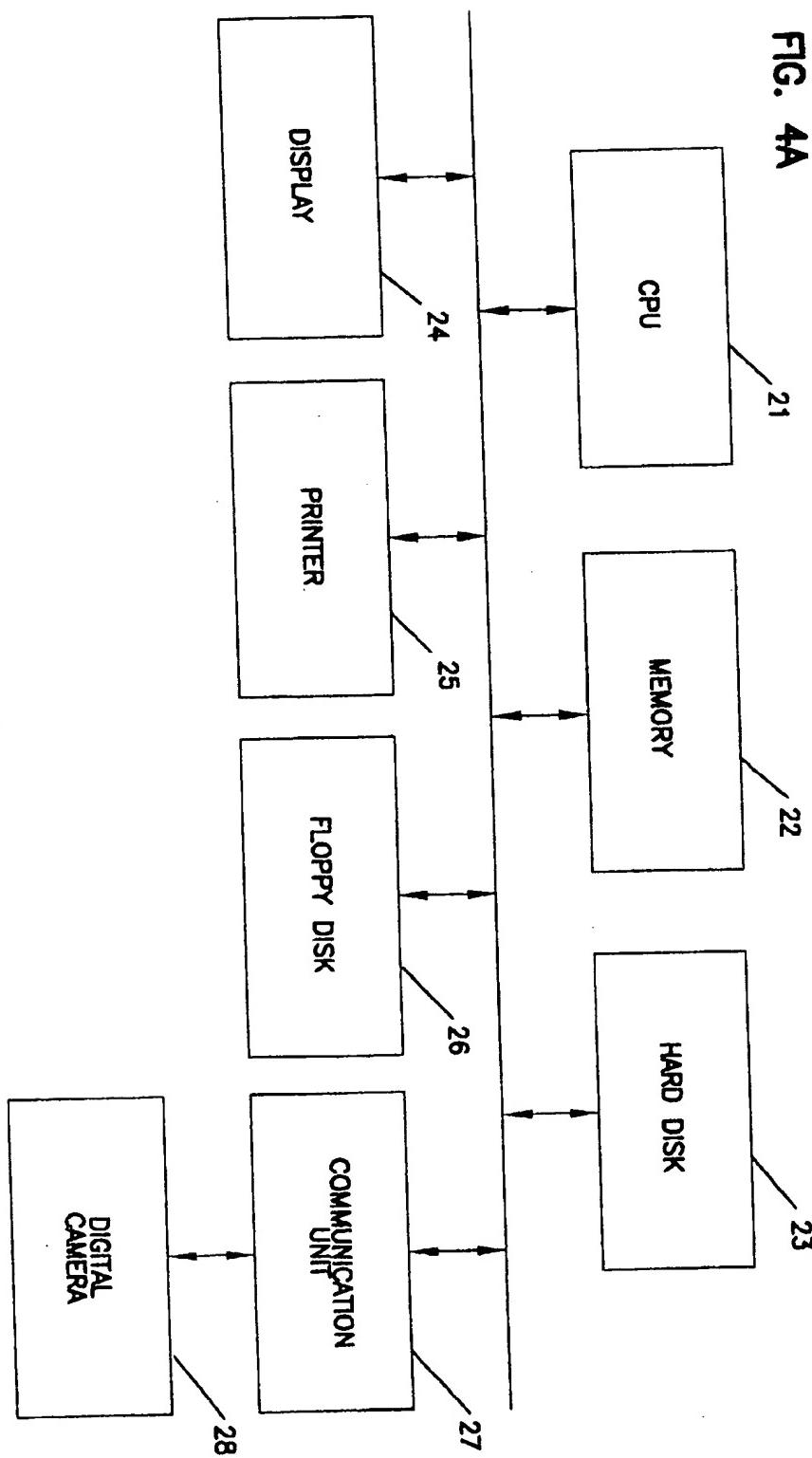
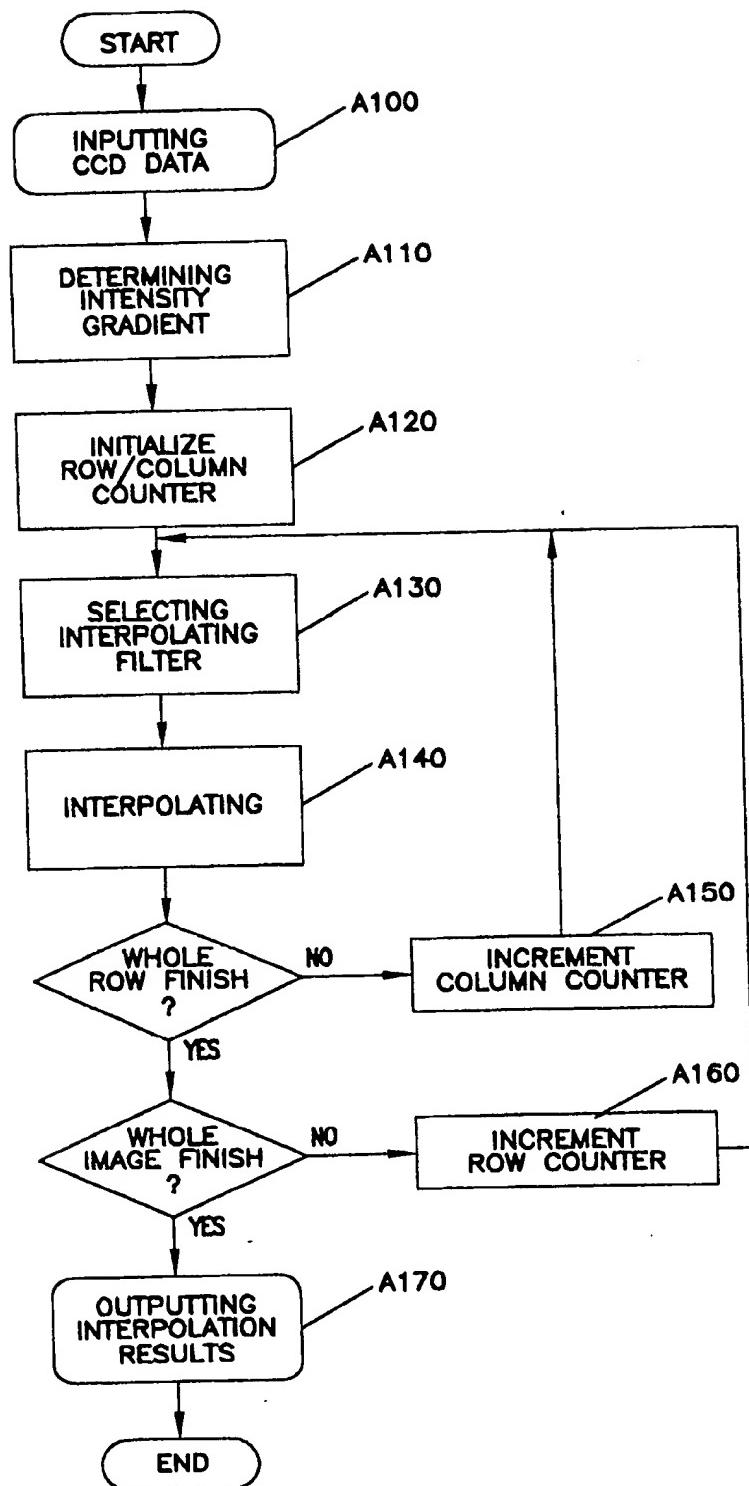


FIG. 4B



**FIG. 2**  
( PRIOR ART )

0	1/2	0
0	0	0
0	1/2	0

(R)

0	0	0
0	1	0
0	0	0

(G)

0	0	0
1/2	0	1/2
0	0	0

(B)

**FIG. 7**

B	G	B
G	R	G
B	G	B

0/0

G	B	G
R	G	R
G	B	G

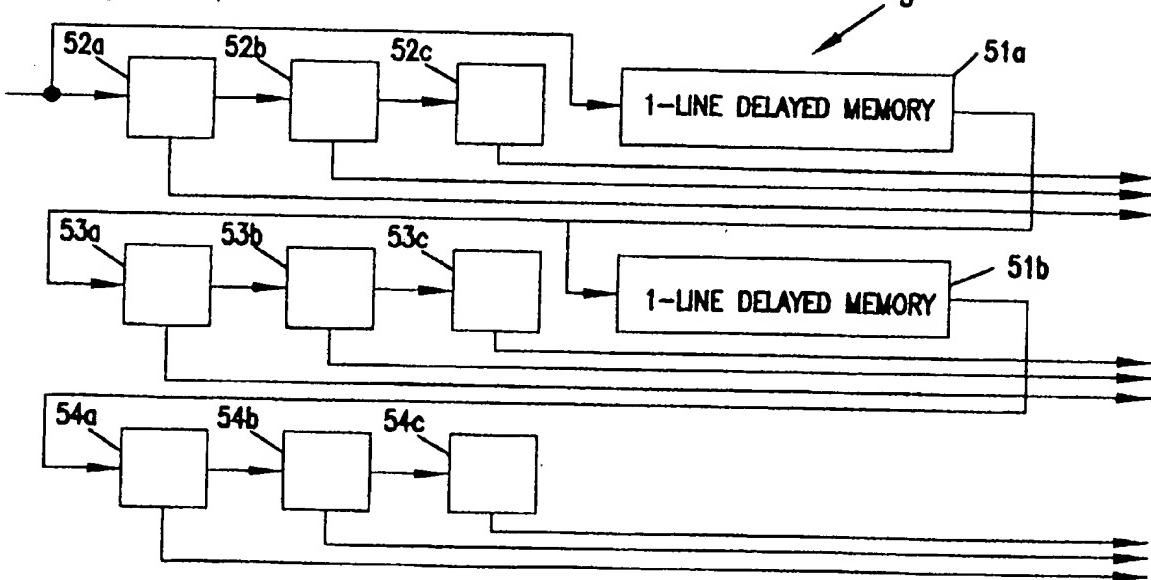
0/1

G	R	G
B	G	B
G	R	G

1/0

R	G	R
G	B	G
R	G	R

1/1

**FIG. 8**

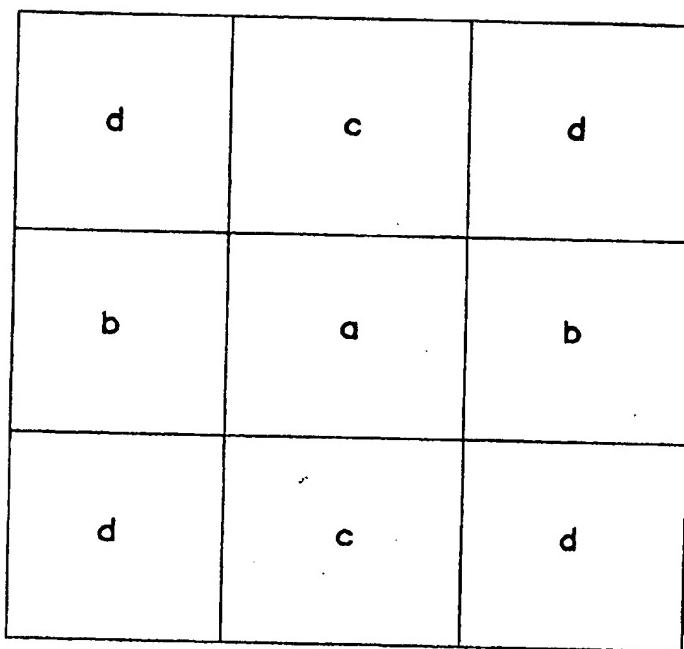
**FIG. 11**

FIG. 12

## VERTICALLY-SENSITIVE FILTER COEFFICIENTS

	R	G	B																											
0/0	<table border="1"> <tr><td>0</td><td>-1/4</td><td>0</td></tr> <tr><td>1/4</td><td>1</td><td>1/4</td></tr> <tr><td>0</td><td>-1/4</td><td>0</td></tr> </table>	0	-1/4	0	1/4	1	1/4	0	-1/4	0	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	1/4	0	1/4	0	1/4	0	<table border="1"> <tr><td>1/4</td><td>1/4</td><td>1/4</td></tr> <tr><td>-1/4</td><td>0</td><td>-1/4</td></tr> <tr><td>1/4</td><td>1/4</td><td>1/4</td></tr> </table>	1/4	1/4	1/4	-1/4	0	-1/4	1/4	1/4	1/4
0	-1/4	0																												
1/4	1	1/4																												
0	-1/4	0																												
0	1/4	0																												
1/4	0	1/4																												
0	1/4	0																												
1/4	1/4	1/4																												
-1/4	0	-1/4																												
1/4	1/4	1/4																												
0/1	<table border="1"> <tr><td>-1/8</td><td>0</td><td>-1/8</td></tr> <tr><td>1/2</td><td>1/2</td><td>1/2</td></tr> <tr><td>-1/8</td><td>0</td><td>-1/8</td></tr> </table>	-1/8	0	-1/8	1/2	1/2	1/2	-1/8	0	-1/8	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	0	1/2	0	1/8	0	1/8	<table border="1"> <tr><td>1/8</td><td>1/2</td><td>1/8</td></tr> <tr><td>0</td><td>-1/2</td><td>0</td></tr> <tr><td>1/8</td><td>1/2</td><td>1/8</td></tr> </table>	1/8	1/2	1/8	0	-1/2	0	1/8	1/2	1/8
-1/8	0	-1/8																												
1/2	1/2	1/2																												
-1/8	0	-1/8																												
1/8	0	1/8																												
0	1/2	0																												
1/8	0	1/8																												
1/8	1/2	1/8																												
0	-1/2	0																												
1/8	1/2	1/8																												
1/0	<table border="1"> <tr><td>1/8</td><td>1/2</td><td>1/8</td></tr> <tr><td>0</td><td>-1/2</td><td>0</td></tr> <tr><td>1/8</td><td>1/2</td><td>1/8</td></tr> </table>	1/8	1/2	1/8	0	-1/2	0	1/8	1/2	1/8	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	0	1/2	0	1/8	0	1/8	<table border="1"> <tr><td>-1/8</td><td>0</td><td>-1/8</td></tr> <tr><td>1/2</td><td>1/2</td><td>1/2</td></tr> <tr><td>-1/8</td><td>0</td><td>-1/8</td></tr> </table>	-1/8	0	-1/8	1/2	1/2	1/2	-1/8	0	-1/8
1/8	1/2	1/8																												
0	-1/2	0																												
1/8	1/2	1/8																												
1/8	0	1/8																												
0	1/2	0																												
1/8	0	1/8																												
-1/8	0	-1/8																												
1/2	1/2	1/2																												
-1/8	0	-1/8																												
1/1	<table border="1"> <tr><td>1/4</td><td>1/4</td><td>1/4</td></tr> <tr><td>-1/4</td><td>0</td><td>-1/4</td></tr> <tr><td>1/4</td><td>1/4</td><td>1/4</td></tr> </table>	1/4	1/4	1/4	-1/4	0	-1/4	1/4	1/4	1/4	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	1/4	0	1/4	0	1/4	0	<table border="1"> <tr><td>0</td><td>-1/4</td><td>0</td></tr> <tr><td>1/4</td><td>1</td><td>1/4</td></tr> <tr><td>0</td><td>-1/4</td><td>0</td></tr> </table>	0	-1/4	0	1/4	1	1/4	0	-1/4	0
1/4	1/4	1/4																												
-1/4	0	-1/4																												
1/4	1/4	1/4																												
0	1/4	0																												
1/4	0	1/4																												
0	1/4	0																												
0	-1/4	0																												
1/4	1	1/4																												
0	-1/4	0																												

FIG. 13

## HORIZONTALLY-SENSITIVE FILTER COEFFICIENTS

	R	G	B																											
0/0	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>-1/4</td><td>1</td><td>-1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	-1/4	1	-1/4	0	1/4	0	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	1/4	0	1/4	0	1/4	0	<table border="1"> <tr><td>1/4</td><td>-1/4</td><td>1/4</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>1/4</td><td>-1/4</td><td>1/4</td></tr> </table>	1/4	-1/4	1/4	1/4	0	1/4	1/4	-1/4	1/4
0	1/4	0																												
-1/4	1	-1/4																												
0	1/4	0																												
0	1/4	0																												
1/4	0	1/4																												
0	1/4	0																												
1/4	-1/4	1/4																												
1/4	0	1/4																												
1/4	-1/4	1/4																												
0/1	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>1/2</td><td>-1/2</td><td>1/2</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	1/2	-1/2	1/2	1/8	0	1/8	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	0	1/2	0	1/8	0	1/8	<table border="1"> <tr><td>-1/8</td><td>1/2</td><td>-1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>-1/8</td><td>1/2</td><td>-1/8</td></tr> </table>	-1/8	1/2	-1/8	0	1/2	0	-1/8	1/2	-1/8
1/8	0	1/8																												
1/2	-1/2	1/2																												
1/8	0	1/8																												
1/8	0	1/8																												
0	1/2	0																												
1/8	0	1/8																												
-1/8	1/2	-1/8																												
0	1/2	0																												
-1/8	1/2	-1/8																												
1/0	<table border="1"> <tr><td>-1/8</td><td>1/2</td><td>-1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>-1/8</td><td>1/2</td><td>-1/8</td></tr> </table>	-1/8	1/2	-1/8	0	1/2	0	-1/8	1/2	-1/8	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>0</td><td>1/2</td><td>0</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	0	1/2	0	1/8	0	1/8	<table border="1"> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> <tr><td>1/2</td><td>-1/2</td><td>1/2</td></tr> <tr><td>1/8</td><td>0</td><td>1/8</td></tr> </table>	1/8	0	1/8	1/2	-1/2	1/2	1/8	0	1/8
-1/8	1/2	-1/8																												
0	1/2	0																												
-1/8	1/2	-1/8																												
1/8	0	1/8																												
0	1/2	0																												
1/8	0	1/8																												
1/8	0	1/8																												
1/2	-1/2	1/2																												
1/8	0	1/8																												
1/1	<table border="1"> <tr><td>1/4</td><td>-1/4</td><td>1/4</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>1/4</td><td>-1/4</td><td>1/4</td></tr> </table>	1/4	-1/4	1/4	1/4	0	1/4	1/4	-1/4	1/4	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>1/4</td><td>0</td><td>1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	1/4	0	1/4	0	1/4	0	<table border="1"> <tr><td>0</td><td>1/4</td><td>0</td></tr> <tr><td>-1/4</td><td>1</td><td>-1/4</td></tr> <tr><td>0</td><td>1/4</td><td>0</td></tr> </table>	0	1/4	0	-1/4	1	-1/4	0	1/4	0
1/4	-1/4	1/4																												
1/4	0	1/4																												
1/4	-1/4	1/4																												
0	1/4	0																												
1/4	0	1/4																												
0	1/4	0																												
0	1/4	0																												
-1/4	1	-1/4																												
0	1/4	0																												

**FIG. 14**

$v(i-1,j-1)$	$v(i,j-1)$	$v(i+1,j-1)$
$v(i-1,j)$	$v(i,j)$	$v(i+1,j)$
$v(i-1,j+1)$	$v(i,j+1)$	$v(i+1,j+1)$

**FIG. 15**

255	255	255
0	255	0
255	255	255

FIG. 16

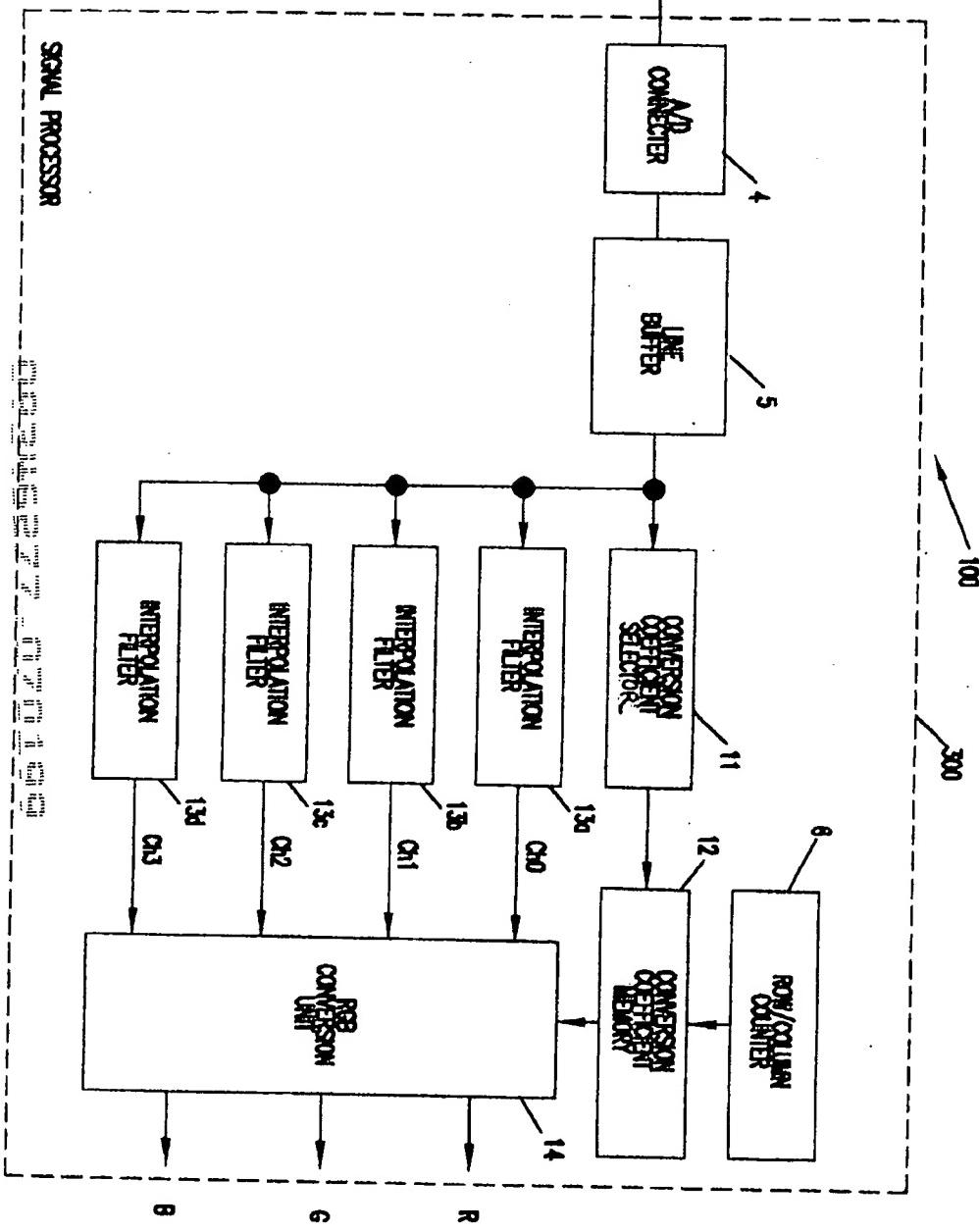


FIG. 17

1	0	1
0	0	0
1	0	1

Ch0

0	1	0
0	0	0
0	1	0

Ch1

0	0	0
1	0	1
0	0	0

Ch2

0	0	0
0	1	0
0	0	0

Ch3

FIG. 19

POSITION : 0/0  $\begin{bmatrix} 0 & 1/4 & -1/4 & 1 \\ 0 & 1/4 & 1/4 & 0 \\ 1/4 & -1/4 & 1/4 & 0 \end{bmatrix}$

POSITION : 0/1  $\begin{bmatrix} 1/8 & 0 & 1/2 & -1/2 \\ 1/8 & 0 & 0 & 1/2 \\ -1/8 & 1/2 & 0 & 1/2 \end{bmatrix}$

POSITION : 1/0  $\begin{bmatrix} -1/8 & 1/2 & 0 & 1/2 \\ 1/8 & 0 & 0 & 1/2 \\ 1/8 & 0 & 1/2 & -1/2 \end{bmatrix}$

POSITION : 1/1  $\begin{bmatrix} 1/4 & -1/4 & 1/4 & 0 \\ 0 & 1/4 & 1/4 & 0 \\ 0 & 1/4 & -1/4 & 1 \end{bmatrix}$

HORIZONTAL GRADIENT MATRIX

POSITION : 0/0  $\begin{bmatrix} 0 & -1/4 & 1/4 & 1 \\ 0 & 1/4 & 1/4 & 0 \\ 1/4 & 1/4 & -1/4 & 0 \end{bmatrix}$

POSITION : 0/1  $\begin{bmatrix} -1/8 & 0 & 1/2 & 1/2 \\ 1/8 & 0 & 0 & 1/2 \\ 1/8 & 1/2 & 0 & -1/2 \end{bmatrix}$

POSITION : 1/0  $\begin{bmatrix} 1/8 & 1/2 & 0 & -1/2 \\ 1/8 & 0 & 0 & 1/2 \\ -1/8 & 0 & 1/2 & 1/2 \end{bmatrix}$

POSITION : 1/1  $\begin{bmatrix} 1/4 & 1/4 & -1/4 & 0 \\ 0 & 1/4 & 1/4 & 0 \\ 0 & -1/4 & 1/4 & 1 \end{bmatrix}$

VERTICAL GRADIENT MATRIX

FIG. 18

